

# SEQUENCE LISTING

<110> Dehesh, Katayoon

<120> Plant Fatty Acid Synthases and Use in Improved Methods for Production of Medium-Chain Fatty Acids

<130> 16518.131

<160> 17

<170> PatentIn version 3.1

<210> 1

<211> 1348

<212> DNA

<213> *Cuphea hookeriana*

<400> 1

```

agctccaccg cggtggcggc cgctctagaa ctagtggatc ccccgggctg caggaattcg      60
gcacgagccg atctcgggtg cgaccgcctc tccaagatcg acaaggagag agccggagtg      120
ctggtcggaa caggaatggg tggctctgact gtcttctctg acgggggttca gtctcttata      180
gagaagggtc accgaaaaat cacccttttc ttcattccct atgccattac aaacatgggg      240
tctgccttgc tcgctatcga atttgggtctc atgggcccac actattcaat ttccactgca      300
tgtgccactt ccaactactg cttccatgct gccgctaata atatccgccg tggtgaggct      360
gatcttatga ttgctggagg cactgaggcc gcaatcattc caattggggtt gggaggcttt      420
gtggcttgca gggctttgtc tcaaaggaac gatgaccgcg agactgcctc taggcccttg      480
gataaagacc gtgatgggtt tgtgatgggt gaagggtctg gagtgttggt gatggagagc      540
ttggaacatg caatgagacg aggagcaccg attattgcag agtatttggg aggtgcaatc      600
aactgtgatg cttatcacat gactgatcca agggctgatg gtcttggtgt ctcttcttgc      660
attgagagta gccttgaaga tgctggcgtc tcacctgaag aggtcaatta cataaatgct      720
catgcgactt ctactctagc tggggatctc gccgagataa atgccatcaa gaagggtttc      780
aagaacacaa aggatatcaa aattaatgca actaagtcaa tgatcggaca ctgtcttgga      840
gcatctggag gtcttgaagc tatagcgact attaaggga taaacaccgg ctggcttcat      900
cccagcatta atcaattcaa tctgagcca tcggtggagt tcgacactgt tgccaacaag      960
aagcagcaac acgaagttaa cgttgcgac tcgaattcat tcggatttgg aggccacaac     1020
tcagtcgtgg ctttctcggc tttcaagcca tgattacca tttcacaagg tacttgtcat     1080
tgagaatacg gattatggac ttgcagagta atttcccat gtttgtcgga agagcatatt     1140

```

accacggttg tccgtcaaac ccatttagga tactgttcta tgtaataaaa ctaaggatta 1200  
 ttaattttccc ttttaatcct gtctccagtt tgagcatgaa attatatatta ttttatctta 1260  
 gaaaggtcaa ataagatttt gttttacctc tgtaaaactt ttgtttgtat tggaaaggaa 1320  
 gtgccgtctc aaaaaaaaaa aaaaaaaaaa 1348

<210> 2  
 <211> 350  
 <212> PRT  
 <213> Cuphea hookeriana

<400> 2

Ser Ser Thr Ala Val Ala Ala Ala Leu Glu Leu Val Asp Pro Pro Gly  
 1 5 10 15

Cys Arg Asn Ser Ala Arg Ala Asp Leu Gly Ala Asp Arg Leu Ser Lys  
 20 25 30

Ile Asp Lys Glu Arg Ala Gly Val Leu Val Gly Thr Gly Met Gly Gly  
 35 40 45

Leu Thr Val Phe Ser Asp Gly Val Gln Ser Leu Ile Glu Lys Gly His  
 50 55 60

Arg Lys Ile Thr Pro Phe Phe Ile Pro Tyr Ala Ile Thr Asn Met Gly  
 65 70 75 80

Ser Ala Leu Leu Ala Ile Glu Phe Gly Leu Met Gly Pro Asn Tyr Ser  
 85 90 95

Ile Ser Thr Ala Cys Ala Thr Ser Asn Tyr Cys Phe His Ala Ala Ala  
 100 105 110

Asn His Ile Arg Arg Gly Glu Ala Asp Leu Met Ile Ala Gly Gly Thr  
 115 120 125

Glu Ala Ala Ile Ile Pro Ile Gly Leu Gly Gly Phe Val Ala Cys Arg  
 130 135 140

Ala Leu Ser Gln Arg Asn Asp Asp Pro Gln Thr Ala Ser Arg Pro Trp  
 145 150 155 160

Asp Lys Asp Arg Asp Gly Phe Val Met Gly Glu Gly Ala Gly Val Leu  
165 170 175

Val Met Glu Ser Leu Glu His Ala Met Arg Arg Gly Ala Pro Ile Ile  
180 185 190

Ala Glu Tyr Leu Gly Gly Ala Ile Asn Cys Asp Ala Tyr His Met Thr  
195 200 205

Asp Pro Arg Ala Asp Gly Leu Gly Val Ser Ser Cys Ile Glu Ser Ser  
210 215 220

Leu Glu Asp Ala Gly Val Ser Pro Glu Glu Val Asn Tyr Ile Asn Ala  
225 230 235 240

His Ala Thr Ser Thr Leu Ala Gly Asp Leu Ala Glu Ile Asn Ala Ile  
245 250 255

Lys Lys Val Phe Lys Asn Thr Lys Asp Ile Lys Ile Asn Ala Thr Lys  
260 265 270

Ser Met Ile Gly His Cys Leu Gly Ala Ser Gly Gly Leu Glu Ala Ile  
275 280 285

Ala Thr Ile Lys Gly Ile Asn Thr Gly Trp Leu His Pro Ser Ile Asn  
290 295 300

Gln Phe Asn Pro Glu Pro Ser Val Glu Phe Asp Thr Val Ala Asn Lys  
305 310 315 320

Lys Gln Gln His Glu Val Asn Val Ala Ile Ser Asn Ser Phe Gly Phe  
325 330 335

Gly Gly His Asn Ser Val Val Ala Phe Ser Ala Phe Lys Pro  
340 345 350

<210> 3  
<211> 1703  
<212> DNA  
<213> Cuphea hookeriana

<220>  
<221> misc\_feature  
<222> (44)..(1499)

<223> unsure at all n locations

<400> 3

aaattaaccc tcactaaagg gaacaaaagc tggagctcca ccgnggtggc ggccgctcta	60
gaactagtgg atcccccgga ctgcaggaat tcggcacgag ccggcatggg cctcgtctcc	120
gtattcggct ccgacgtcga ctcttattac gaaaagctcc tctccggcga gagcgggatc	180
agcttaatcg accgcttcga cgcttccaag ttccccacca ggttcggcgg ccagatccgg	240
ggattcaacg cgacgggata catcgacggg aagaacgaca ggaggctcga cgattgcctc	300
gctactgcat tgtcgccggg aagaaggctc tcgaaaattc cgatctcggc ggtgaaagcc	360
tctccaagat tgataaggag agagctggag tgctagttag aactggtagt ggtggcctaa	420
ccgtcttctc tgacgggggtt cagaatctca tcgagaaagg tcaccggaag atctccccgt	480
ttttcattcc ctatgccatt acaaacatgg ggtctgctct gcttgccatc gatttgggtc	540
tgatggggcc aaactattcg atttcaactg catgtgctac ttccaactac tgcttttatg	600
ccgctgccaa tcatatccgc cgaggcgagg ctgacctcat gattgctgga ggaactgagg	660
ctgcaatcat tccaattggg ttaggaggat tcgttgcttg cagggcttta tctcaaagga	720
atgatgacct tcagactgcc tcaaggccgt gggataagga ccgtgatggg tttgtgatgg	780
gcgaaggggc tggagtattg gttatggaga gcttgaaca tgcaatgaaa cgaggagcgc	840
cgattattgc agaatatatt ggagggtgcag tcaattgtga tgcttatcat atgactgac	900
caagggtcga tgggcttggg gtctcctctt gcattgagag cagtctggaa gatgctgggg	960
tctcacctga agagggtcaat tacataaatg ctcatgcgac ttccactctt gctgggggatc	1020
ttgccgagat aaatgccatc aagaagggtt tcaagaacac caaggaaatc acaatcaatg	1080
caactaagtc gatgatcgga cactgtcttg gagcatcagg gggctctgaa gccattgcga	1140
caattaaggg aataaccacc ggctggcttc atcccagcat aaaccaattc aatcccgagc	1200
catcagtgga attcgacaca gttgccaaca agaagcagca acatgaagtg aatgttgcta	1260
tctcaaattc attcggattc ggaggccaca actcagttgt agctttctca gccttcaagc	1320
catgattact cggttcaaatt gcaaatttgt tgctgagaca gtgagcttca acttgagag	1380
caatttttta catgccttgt cgtcgggaaga gcgtaatacc gggatagttc cttgatagtt	1440
catttaggat gttttactgc aataatcgaa gattatttcc attctaattc agtctccgnc	1500
gagtttgaga atctatctgt ttgtattaga aagaacgagg caagattttg tttcatgttt	1560
gtgtttgtat tactttcttt ttgcccttgt caatggcatt taagataagc ttataaaaaa	1620

aaaaaaaaaa aaaaaaactc gagggggggc ccggtaccca attcgcccta tagtgagtcg 1680  
tatgacaatt cactgtccgt cgg 1703

<210> 4  
<211> 441  
<212> PRT  
<213> Cuphea hookeriana

<220>  
<221> Unsure  
<222> (15)..(15)  
<223> X = Any Amino Acid

<220>  
<221> misc\_feature  
<222> (15)..(15)  
<223> X = Any Amino Acid

<400> 4

Lys Leu Thr Leu Thr Lys Gly Asn Lys Ser Trp Ser Ser Thr Xaa Val  
1 5 10 15

Ala Ala Ala Leu Glu Leu Val Asp Pro Pro Gly Cys Arg Asn Ser Ala  
20 25 30

Arg Ala Gly Met Gly Leu Val Ser Val Phe Gly Ser Asp Val Asp Ser  
35 40 45

Tyr Tyr Glu Lys Leu Leu Ser Gly Glu Ser Gly Ile Ser Leu Ile Asp  
50 55 60

Arg Phe Asp Ala Ser Lys Phe Pro Thr Arg Phe Gly Gly Gln Ile Arg  
65 70 75 80

Gly Phe Asn Ala Thr Gly Tyr Ile Asp Gly Lys Asn Asp Arg Arg Leu  
85 90 95

Asp Asp Cys Leu Arg Tyr Cys Ile Val Ala Gly Lys Lys Ala Leu Glu  
100 105 110

Asn Ser Asp Leu Gly Gly Glu Ser Leu Ser Lys Ile Asp Lys Glu Arg  
115 120 125

Ala Gly Val Leu Val Gly Thr Gly Met Gly Gly Leu Thr Val Phe Ser  
 130 135 140

Asp Gly Val Gln Asn Leu Ile Glu Lys Gly His Arg Lys Ile Ser Pro  
 145 150 155 160

Phe Phe Ile Pro Tyr Ala Ile Thr Asn Met Gly Ser Ala Leu Leu Ala  
 165 170 175

Ile Asp Leu Gly Leu Met Gly Pro Asn Tyr Ser Ile Ser Thr Ala Cys  
 180 185 190

Ala Thr Ser Asn Tyr Cys Phe Tyr Ala Ala Ala Asn His Ile Arg Arg  
 195 200 205

Gly Glu Ala Asp Leu Met Ile Ala Gly Gly Thr Glu Ala Ala Ile Ile  
 210 215 220

Pro Ile Gly Leu Gly Gly Phe Val Ala Cys Arg Ala Leu Ser Gln Arg  
 225 230 235 240

Asn Asp Asp Pro Gln Thr Ala Ser Arg Pro Trp Asp Lys Asp Arg Asp  
 245 250 255

Gly Phe Val Met Gly Glu Gly Ala Gly Val Leu Val Met Glu Ser Leu  
 260 265 270

Glu His Ala Met Lys Arg Gly Ala Pro Ile Ile Ala Glu Tyr Leu Gly  
 275 280 285

Gly Ala Val Asn Cys Asp Ala Tyr His Met Thr Asp Pro Arg Ala Asp  
 290 295 300

Gly Leu Gly Val Ser Ser Cys Ile Glu Ser Ser Leu Glu Asp Ala Gly  
 305 310 315 320

Val Ser Pro Glu Glu Val Asn Tyr Ile Asn Ala His Ala Thr Ser Thr  
 325 330 335

Leu Ala Gly Asp Leu Ala Glu Ile Asn Ala Ile Lys Lys Val Phe Lys  
 340 345 350

Asn Thr Lys Glu Ile Thr Ile Asn Ala Thr Lys Ser Met Ile Gly His  
 355 360 365

Cys Leu Gly Ala Ser Gly Gly Leu Glu Ala Ile Ala Thr Ile Lys Gly  
 370 375 380

Ile Thr Thr Gly Trp Leu His Pro Ser Ile Asn Gln Phe Asn Pro Glu  
 385 390 395 400

Pro Ser Val Glu Phe Asp Thr Val Ala Asn Lys Lys Gln Gln His Glu  
 405 410 415

Val Asn Val Ala Ile Ser Asn Ser Phe Gly Phe Gly Gly His Asn Ser  
 420 425 430

Val Val Ala Phe Ser Ala Phe Lys Pro  
 435 440

<210> 5  
 <211> 2046  
 <212> DNA  
 <213> Cuphea hookeriana

<400> 5

```
actaaagga aaaaaagctg gagctccacc gcggtggcgg ccgctctaga actagtggat    60
ccccggggt gcaggaattc ggcacgagtt ttcttacttg ggtcgggtca gctcaggtgt    120
tccaatggcg accgcttctt gcatgggtgc gtccccctttc tgtacgtggc tcgtagctgc    180
atgcatgccc acttcatccg acaacgaccc acgttccctt tcccacaagc ggctccgctt    240
ctcccgtcgc cggaggactc tctcctccca ttgctccctc cgcggatcca ctttccaatg    300
cctcgatcct tgcaaccagc aacgcttcct cggggataac ggattcgctt ccctcttcgg    360
atccaagcct cttcgttcaa atcgcggccca cctgaggctc ggccgcactt cccattccgg    420
ggaggtcatg gctgtggcta tgcaacctgc acaggaagtc tccacaaata agaaacctgc    480
taccaagcaa aggcgagtag ttgtgacagg tatgggcgtg gtgactcctc taggccatga    540
ccccgatgtt tactacaaca atctcctaga cggaataagt ggcataagtg agatagagaa    600
cttcgactgc tctcagtttc ccacgagaat tgccggagag atcaagtctt tttccacaga    660
tggtctgggtg gccccaaagt tctccgagag gatggacaag ttcattgctt acatgctgac    720
tgcaggcaag aaagcattag cagatggtgg aatcactgaa gatgcgatga aagagctcaa    780
```

taaaagaaag tgtggagttc tcattggctc cggattgggc ggtatgaagg tattcagcga	840
ttccattgaa gctctgagga cttcatataa gaagatcagt cccttttgtg tacctttttc	900
taccacaaat atgggatccg ctattcttgc aatggacttg ggatggatgg gccctaacta	960
ttcgatatca actgcctgtg caacaagtaa cttctgtata ctgaatgctg cgaaccacat	1020
aatcaaaggc gaagcagaca tgatgctttg tgggtggctcg gatgcggccg ttttacctgt	1080
tggtttgga ggtttcgtag catgccgagc tttgtcacag aggaataatg accctaccaa	1140
agcttcgaga ccatgggaca gtaatcgtga tggatttgtg atgggagaag gagctggagt	1200
tttacttctt gaggagttag agcatgcaaa gaaaagaggt gcaaccattt atgcggaatt	1260
tctaggtggg agtttcaactt gcgacgccta ccacatgacc ggcctcacc ctgaaggagc	1320
tgggtgtgatc ctctgcatag agaaggcctt ggctcagtcg ggagtctcga gggaagacgt	1380
aaattacata aatgcgcatg caacttccac tctgtctgga gatatcaagg aataccaagc	1440
tctcgcccac tgtttcggcc aaaacagtga gctgagagtg aattccacca aatcgatgat	1500
cggtcacctt cttggaggag ctggtggcgt agaagcagtt gcagtagttc aggcaataag	1560
gacaggatgg atccatccaa atattaattt ggaagacccg gacgaaggcg tggatgcaaa	1620
actgctcgtc ggccctaaga aggagaaact gaaggtcaag gtcggtttgt ccaattcatt	1680
tgggttcggc ggccataact catccatact atttgcccc tgcaactaga aaagagtctg	1740
tggaagccga gagtctttga gaactcatgc acgtagtag cttcttatgc ctctgaaacc	1800
gagatagacc ggctactcga ggggatgcc aagatactcc ttgccggtat tgggtgtaag	1860
agatcactgc ttgtcccttt tattttcttc ttcttttgag agctttaacc gaggtagtcg	1920
tattttcgag cttttcgaat acatgttcgt tatcggatca atgtgtttct tctaagatca	1980
tttgtaatgc atattttgaa aaaccacatc tcagtatgca aaataaaaaa aaaaaaaaaa	2040
aaaaaa	2046

<210> 6  
 <211> 534  
 <212> PRT  
 <213> Cuphea hookeriana  
  
 <400> 6

Met	Ala	Thr	Ala	Ser	Cys	Met	Val	Ala	Ser	Pro	Phe	Cys	Thr	Trp	Leu
1				5					10					15	



Val Ala Ala Cys Met Pro Thr Ser Ser Asp Asn Asp Pro Arg Ser Leu  
20 25 30

Ser His Lys Arg Leu Arg Leu Ser Arg Arg Arg Arg Thr Leu Ser Ser  
35 40 45

His Cys Ser Leu Arg Gly Ser Thr Phe Gln Cys Leu Asp Pro Cys Asn  
50 55 60

Gln Gln Arg Phe Leu Gly Asp Asn Gly Phe Ala Ser Leu Phe Gly Ser  
65 70 75 80

Lys Pro Leu Arg Ser Asn Arg Gly His Leu Arg Leu Gly Arg Thr Ser  
85 90 95

His Ser Gly Glu Val Met Ala Val Ala Met Gln Pro Ala Gln Glu Val  
100 105 110

Ser Thr Asn Lys Lys Pro Ala Thr Lys Gln Arg Arg Val Val Val Thr  
115 120 125

Gly Met Gly Val Val Thr Pro Leu Gly His Asp Pro Asp Val Tyr Tyr  
130 135 140

Asn Asn Leu Leu Asp Gly Ile Ser Gly Ile Ser Glu Ile Glu Asn Phe  
145 150 155 160

Asp Cys Ser Gln Phe Pro Thr Arg Ile Ala Gly Glu Ile Lys Ser Phe  
165 170 175

Ser Thr Asp Gly Trp Val Ala Pro Lys Phe Ser Glu Arg Met Asp Lys  
180 185 190

Phe Met Leu Tyr Met Leu Thr Ala Gly Lys Lys Ala Leu Ala Asp Gly  
195 200 205

Gly Ile Thr Glu Asp Ala Met Lys Glu Leu Asn Lys Arg Lys Cys Gly  
210 215 220

Val Leu Ile Gly Ser Gly Leu Gly Gly Met Lys Val Phe Ser Asp Ser  
225 230 235 240

Ile Glu Ala Leu Arg Thr Ser Tyr Lys Lys Ile Ser Pro Phe Cys Val  
 245 250 255

Pro Phe Ser Thr Thr Asn Met Gly Ser Ala Ile Leu Ala Met Asp Leu  
 260 265 270

Gly Trp Met Gly Pro Asn Tyr Ser Ile Ser Thr Ala Cys Ala Thr Ser  
 275 280 285

Asn Phe Cys Ile Leu Asn Ala Ala Asn His Ile Ile Lys Gly Glu Ala  
 290 295 300

Asp Met Met Leu Cys Gly Gly Ser Asp Ala Ala Val Leu Pro Val Gly  
 305 310 315 320

Leu Gly Gly Phe Val Ala Cys Arg Ala Leu Ser Gln Arg Asn Asn Asp  
 325 330 335

Pro Thr Lys Ala Ser Arg Pro Trp Asp Ser Asn Arg Asp Gly Phe Val  
 340 345 350

Met Gly Glu Gly Ala Gly Val Leu Leu Leu Glu Glu Leu Glu His Ala  
 355 360 365

Lys Lys Arg Gly Ala Thr Ile Tyr Ala Glu Phe Leu Gly Gly Ser Phe  
 370 375 380

Thr Cys Asp Ala Tyr His Met Thr Glu Pro His Pro Glu Gly Ala Gly  
 385 390 395 400

Val Ile Leu Cys Ile Glu Lys Ala Leu Ala Gln Ser Gly Val Ser Arg  
 405 410 415

Glu Asp Val Asn Tyr Ile Asn Ala His Ala Thr Ser Thr Pro Ala Gly  
 420 425 430

Asp Ile Lys Glu Tyr Gln Ala Leu Ala His Cys Phe Gly Gln Asn Ser  
 435 440 445

Glu Leu Arg Val Asn Ser Thr Lys Ser Met Ile Gly His Leu Leu Gly  
 450 455 460

Gly Ala Gly Gly Val Glu Ala Val Ala Val Val Gln Ala Ile Arg Thr  
 465 470 475 480

Gly Trp Ile His Pro Asn Ile Asn Leu Glu Asp Pro Asp Glu Gly Val  
 485 490 495

Asp Ala Lys Leu Leu Val Gly Pro Lys Lys Glu Lys Leu Lys Val Lys  
 500 505 510

Val Gly Leu Ser Asn Ser Phe Gly Phe Gly Gly His Asn Ser Ser Ile  
 515 520 525

Leu Phe Ala Pro Cys Asn  
 530

<210> 7  
 <211> 1921  
 <212> DNA  
 <213> Cuphea hookeriana

<400> 7  
 cggcagcagg tcacctctta cctcgccctgc ttcgagccct gccatgacta ctacacctcc 60  
 gcaccccttgt tcggatccag gcccatccgc accacccgca ggcaccggag gctcaatcga 120  
 gcttccccctt ccgggggaggc aatggctgtg gctctgcaac ctgcacagga agttaccaca 180  
 aagaagaagc caagtatcaa acagcggcga gtagttgtga ctggaatggg tgtggtgact 240  
 cctctaggcc atgaccctga tgttttctac aataatctgc ttgatggaac gagtggcata 300  
 agtgagatag agacctttga ttgtgctcaa tttcctacga gaattgctgg agagatcaag 360  
 tctttctcca cagatgggtg ggtggccccg aagctctcca agaggatgga caagttcatg 420  
 ctttacatgc tgactgcccg caagaaagca ttaacaaatg gtggaatcac cgaagatgtg 480  
 atgaaagagc tagataaaaag aaaatgcgga gttctcattg gctcagcaat gggtggaatg 540  
 aaggatttca atgatgccat tgaagcccta aggatttcat ataagaagat gaatcccttt 600  
 tgtgtacctt tcgctaccac aaatatggga tcagctatgc ttgcaatgga cttgggatgg 660  
 atgggccccca actactcgat atctactgct tgtgcaacga gtaacttttg tctcctgaat 720  
 gctgcgaacc acataatcag aggcgaagca gatgtgatgc tttgcggggg ctcagatgcg 780  
 gtaatcatal ctattggtat gggagggtttt gttgcatgcc gagctttgtc acagagaaat 840  
 gccgacccta ctaaagcttc aagaccatgg gacagtaatc gtgatggatt tgttatgggg 900  
 gaaggagctg gagtgctact actagaggag ttagagcatg caaagaaaag aggtgcgact 960

atttacgcag aatttctagg tggaagtttc acttgcgatg cctaccacat gaccgagcct 1020  
 caccctgatg gagctggagt gattctctgc atagagaagg ctttgggtca gtcaggagtc 1080  
 tctaggggaag acgtaaatta cataaatgca catgccacat ccactccagc tggagatatc 1140  
 aaagagtacc aagctcttat ccactgtttc ggccaaaaca acgagttaaa agtgaattct 1200  
 accaaatcaa tgattggtca ccttctcgga gcagccggtg gtgtggaagc agtttcagta 1260  
 gttcaggcaa taaggactgg gtggatccat ccgaatatta atttggaaaa ccagatgaa 1320  
 ggcgtggata ccaaattgct cgtgggccct aagaaggaga gactgaacat taaggtcggt 1380  
 ttgtctaatt cattcgggtt tgggtgggcac aactcgtcca tactcttcgc cccttacaac 1440  
 tagggcgttt catgtgtgga attctactca atctatcaaa gctgaagttt tgaggactcc 1500  
 agcatgttgg tagctcctta cgtctctaga catgcccatg agttttgtgt cgggagctgt 1560  
 agtcggaacc atgacggatt gagtactcat ggcgacacag gatatactcc ttgctagaat 1620  
 tgttagagca ctattcatta tcccattttt tttctgaaat ctccctcctt acggtagttg 1680  
 tactttcgag cgtttcatcg agtcagtga gaagagaaca aagctaactc gggcacgtag 1740  
 taaccatttg ccctttgttt tgctctctat tttatcgccg ttttgtgggt taaaatttgt 1800  
 aaaactagac gactggtttg ttttctcttg atcattggag atgtatggcc atatttgcct 1860  
 ttcattgatg ataaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1920  
 a 1921

<210> 8  
 <211> 420  
 <212> PRT  
 <213> Cuphea hookeriana

<400> 8

Lys Lys Lys Pro Ser Ile Lys Gln Arg Arg Val Val Val Thr Gly Met  
 1 5 10 15

Gly Val Val Thr Pro Leu Gly His Asp Pro Asp Val Phe Tyr Asn Asn  
 20 25 30

Leu Leu Asp Gly Thr Ser Gly Ile Ser Glu Ile Glu Thr Phe Asp Cys  
 35 40 45

Ala Gln Phe Pro Thr Arg Ile Ala Gly Glu Ile Lys Ser Phe Ser Thr  
 50 55 60

Asp	Gly	Trp	Val	Ala	Pro	Lys	Leu	Ser	Lys	Arg	Met	Asp	Lys	Phe	Met	65	70	75	80
Leu	Tyr	Met	Leu	Thr	Ala	Gly	Lys	Lys	Ala	Leu	Thr	Asn	Gly	Gly	Ile	85	90	95	
Thr	Glu	Asp	Val	Met	Lys	Glu	Leu	Asp	Lys	Arg	Lys	Cys	Gly	Val	Leu	100	105	110	
Ile	Gly	Ser	Ala	Met	Gly	Gly	Met	Lys	Val	Phe	Asn	Asp	Ala	Ile	Glu	115	120	125	
Ala	Leu	Arg	Ile	Ser	Tyr	Lys	Lys	Met	Asn	Pro	Phe	Cys	Val	Pro	Phe	130	135	140	
Ala	Thr	Thr	Asn	Met	Gly	Ser	Ala	Met	Leu	Ala	Met	Asp	Leu	Gly	Trp	145	150	155	160
Met	Gly	Pro	Asn	Tyr	Ser	Ile	Ser	Thr	Ala	Cys	Ala	Thr	Ser	Asn	Phe	165	170	175	
Cys	Ile	Leu	Asn	Ala	Ala	Asn	His	Ile	Ile	Arg	Gly	Glu	Ala	Asp	Val	180	185	190	
Met	Leu	Cys	Gly	Gly	Ser	Asp	Ala	Val	Ile	Ile	Pro	Ile	Gly	Met	Gly	195	200	205	
Gly	Phe	Val	Ala	Cys	Arg	Ala	Leu	Ser	Gln	Arg	Asn	Ala	Asp	Pro	Thr	210	215	220	
Lys	Ala	Ser	Arg	Pro	Trp	Asp	Ser	Asn	Arg	Asp	Gly	Phe	Val	Met	Gly	225	230	235	240
Glu	Gly	Ala	Gly	Val	Leu	Leu	Leu	Glu	Glu	Leu	Glu	His	Ala	Lys	Lys	245	250	255	
Arg	Gly	Ala	Thr	Ile	Tyr	Ala	Glu	Phe	Leu	Gly	Gly	Ser	Phe	Thr	Cys	260	265	270	
Asp	Ala	Tyr	His	Met	Thr	Glu	Pro	His	Pro	Asp	Gly	Ala	Gly	Val	Ile	275	280	285	

Leu Cys Ile Glu Lys Ala Leu Ala Gln Ser Gly Val Ser Arg Glu Asp  
 290 295 300

Val Asn Tyr Ile Asn Ala His Ala Thr Ser Thr Pro Ala Gly Asp Ile  
 305 310 315 320

Lys Glu Tyr Gln Ala Leu Ile His Cys Phe Gly Gln Asn Asn Glu Leu  
 325 330 335

Lys Val Asn Ser Thr Lys Ser Met Ile Gly His Leu Leu Gly Ala Ala  
 340 345 350

Gly Gly Val Glu Ala Val Ser Val Val Gln Ala Ile Arg Thr Gly Trp  
 355 360 365

Ile His Pro Asn Ile Asn Leu Glu Asn Pro Asp Glu Gly Val Asp Thr  
 370 375 380

Lys Leu Leu Val Gly Pro Lys Lys Glu Arg Leu Asn Ile Lys Val Gly  
 385 390 395 400

Leu Ser Asn Ser Phe Gly Phe Gly Gly His Asn Ser Ser Ile Leu Phe  
 405 410 415

Ala Pro Tyr Asn  
 420

<210> 9  
 <211> 1713  
 <212> DNA  
 <213> Cuphea pulcherrima

<400> 9  
 ctggtacgcc tgcaggtacc ggtccggaat tcccgggtcg acccaacggt cegtattccc 60  
 actccgatcg ttcttcttcc accgcatctc ttctcttctc ttggcttctc cgccatcctc 120  
 cgccgccatg cattccctcc agtcaccctc ccttcggggc tccccgctcg accccttccg 180  
 ccccaaata tccaccgtcc gccccctcca ccgagcatca attcccaacg tccgggcccgc 240  
 ttccccacc gtctccgctc ccaagcgcgga gaccgacccc aagaagcgcg tcgtgatcac 300  
 cggaatgggc cttgtctccg ttttcggctc cgacgtcgat gcgtactacg acaagctcct 360  
 gtcaggcgag agcgggatcg gcccaatcga ccgcttcgac gcctccaagt tccccaccag 420

```

gttcggcggc cagattcgtg gtttcaactc catgggatac attgacggca aaaacgacag 480
gcggcttgat gattgccttc gctactgcat tgtcgccggg aagaagtctc ttgaggacgc 540
cgatctcggg gccgaccgcc tctccaagat cgacaaggag agagccggag tgctggttgg 600
gacaggaatg ggtggtctga ctgtcttctc tgacgggggt caatctctta tcgagaaggg 660
tcaccgaaa atcacccctt tttcatccc ctatgccatt acaaacatgg ggtctgccct 720
gctcgctatt gaactcggtc tgatggggcc aaactattca atttccactg catgtgccac 780
ttccaactac tgcttccatg ctgctgctaa tcatatccgc cgtggtgagg ctgatcttat 840
gattgctgga ggcactgagg ccgcaatcat tccaattggg ttgggaggct ttgtggcttg 900
cagggctctg tctcaaagga acgatgacc tcagactgcc tctaggccct gggataaaga 960
ccgtgatggt tttgtgatgg gtgaagggtgc tggagtgttg gtgctggaga gcttgaaca 1020
tgcaatgaaa cgaggagcac ctattattgc agagtatttg ggaggtgcaa tcaactgtga 1080
tgcttatcac atgactgacc caagggtga tgggtctcgg gtctctctt gcattgagag 1140
tagccttgaa gatgctggcg tctcacctga agaggtcaat tacataaatg ctcatgagac 1200
ttctactcta gctggggatc tcgccgagat aaatgccatc aagaagggtt tcaagaacac 1260
aaaggatata aaaattaatg caactaagtc aatgatcgga cactgtcttg gagcctctgg 1320
aggctctgaa gctatagcga ctattaaggg aataaacacc ggctggcttc atcccagcat 1380
taatcaattc aatcctgagc catccgtgga gttcgacact gttgccaaca agaagcagca 1440
acacgaagtt aatgttgcca tctcgaattc atttggattc ggaggccaca actcagtcgt 1500
ggctttctcg gctttcaagc catgattacc catttcacaa ggcacttgtc attgagagta 1560
cggttgttcg tcaaaccat ttaggatact gttctatgta aaaaaaagta aggattatca 1620
ctttcccttc taatcctgtc tccagtttga gaatgaaatt atatttatat taaaaaaaaa 1680
aaaaaagggc ggccgctcta gaggatccaa gct 1713

```

```

<210> 10
<211> 465
<212> PRT
<213> Cuphea pulcherrima

```

```

<400> 10

```

```

Met His Ser Leu Gln Ser Pro Ser Leu Arg Ala Ser Pro Leu Asp Pro
1           5           10           15

```

```

Phe Arg Pro Lys Ser Ser Thr Val Arg Pro Leu His Arg Ala Ser Ile

```

20

25

30

Pro Asn Val Arg Ala Ala Ser Pro Thr Val Ser Ala Pro Lys Arg Glu  
 35 40 45

Thr Asp Pro Lys Lys Arg Val Val Ile Thr Gly Met Gly Leu Val Ser  
 50 55 60

Val Phe Gly Ser Asp Val Asp Ala Tyr Tyr Asp Lys Leu Leu Ser Gly  
 65 70 75 80

Glu Ser Gly Ile Gly Pro Ile Asp Arg Phe Asp Ala Ser Lys Phe Pro  
 85 90 95

Thr Arg Phe Gly Gly Gln Ile Arg Gly Phe Asn Ser Met Gly Tyr Ile  
 100 105 110

Asp Gly Lys Asn Asp Arg Arg Leu Asp Asp Cys Leu Arg Tyr Cys Ile  
 115 120 125

Val Ala Gly Lys Lys Ser Leu Glu Asp Ala Asp Leu Gly Ala Asp Arg  
 130 135 140

Leu Ser Lys Ile Asp Lys Glu Arg Ala Gly Val Leu Val Gly Thr Gly  
 145 150 155 160

Met Gly Gly Leu Thr Val Phe Ser Asp Gly Val Gln Ser Leu Ile Glu  
 165 170 175

Lys Gly His Arg Lys Ile Thr Pro Phe Phe Ile Pro Tyr Ala Ile Thr  
 180 185 190

Asn Met Gly Ser Ala Leu Leu Ala Ile Glu Leu Gly Leu Met Gly Pro  
 195 200 205

Asn Tyr Ser Ile Ser Thr Ala Cys Ala Thr Ser Asn Tyr Cys Phe His  
 210 215 220

Ala Ala Ala Asn His Ile Arg Arg Gly Glu Ala Asp Leu Met Ile Ala  
 225 230 235 240

Gly Gly Thr Glu Ala Ala Ile Ile Pro Ile Gly Leu Gly Gly Phe Val



				245						250						255
Ala	Cys	Arg	Ala	Leu	Ser	Gln	Arg	Asn	Asp	Asp	Pro	Gln	Thr	Ala	Ser	
			260					265					270			
Arg	Pro	Trp	Asp	Lys	Asp	Arg	Asp	Gly	Phe	Val	Met	Gly	Glu	Gly	Ala	
		275					280					285				
Gly	Val	Leu	Val	Leu	Glu	Ser	Leu	Glu	His	Ala	Met	Lys	Arg	Gly	Ala	
	290					295					300					
Pro	Ile	Ile	Ala	Glu	Tyr	Leu	Gly	Gly	Ala	Ile	Asn	Cys	Asp	Ala	Tyr	
305					310					315					320	
His	Met	Thr	Asp	Pro	Arg	Ala	Asp	Gly	Leu	Gly	Val	Ser	Ser	Cys	Ile	
				325					330					335		
Glu	Ser	Ser	Leu	Glu	Asp	Ala	Gly	Val	Ser	Pro	Glu	Glu	Val	Asn	Tyr	
			340					345					350			
Ile	Asn	Ala	His	Ala	Thr	Ser	Thr	Leu	Ala	Gly	Asp	Leu	Ala	Glu	Ile	
		355					360					365				
Asn	Ala	Ile	Lys	Lys	Val	Phe	Lys	Asn	Thr	Lys	Asp	Ile	Lys	Ile	Asn	
	370					375					380					
Ala	Thr	Lys	Ser	Met	Ile	Gly	His	Cys	Leu	Gly	Ala	Ser	Gly	Gly	Leu	
385					390					395					400	
Glu	Ala	Ile	Ala	Thr	Ile	Lys	Gly	Ile	Asn	Thr	Gly	Trp	Leu	His	Pro	
				405					410					415		
Ser	Ile	Asn	Gln	Phe	Asn	Pro	Glu	Pro	Ser	Val	Glu	Phe	Asp	Thr	Val	
			420					425					430			
Ala	Asn	Lys	Lys	Gln	Gln	His	Glu	Val	Asn	Val	Ala	Ile	Ser	Asn	Ser	
		435					440					445				
Phe	Gly	Phe	Gly	Gly	His	Asn	Ser	Val	Val	Ala	Phe	Ser	Ala	Phe	Lys	
	450					455					460					
Pro																
465																

<210> 11  
 <211> 1802  
 <212> DNA  
 <213> *Cuphea pulcherrima*

<400> 11  
 ggtcgaccca cgcgtccggg ctttccgacc acatttcatt tcttgccctg ttatctccgc 60  
 cgctcctcgc cgcgtggtcg ccgcgcgcgc catgcaatcc ctccactccc cttccctcgc 120  
 ccctcccccct ctgagacct tccgcctcaa tccccctcc tccgcgcgcg ctctccgccc 180  
 cctccgtcgc gccagcctcc ccgtcatccg tgctgccacc gcctccgccc ccaagcgcga 240  
 gtccgacccc aagaagcggg tcgtcatcac cggcatgggc ctggtctcgc tcttcggctc 300  
 cgacgtcgac gcctactacg acaagctgct ctccggcgag agcggcatca gcctaatacga 360  
 ccgcttcgac gcttccaaat tccccaccag gttcgccggc cagatccgtg gcttcaacgc 420  
 gacgggctac atcgacggca agaacgaccg gcggctcgac gattgcctcc gctactgcat 480  
 tgctgcgcgc aagaaggctc tcgaagacgc cgatctcgcc ggccaatccc tctccaagat 540  
 tgataaggag agggccggag tgctagttgg aaccggtatg ggtggcctaa ctgtcttctc 600  
 tgacgggggt cagaatctca tcgagaaagg tcaccggaag atctccccgt ttttcattcc 660  
 atatgccatt acaaacatgg ggtctgcgct gcttgccatc gatttgggtc tgatgggccc 720  
 aaactattcg atttcaactg catgtgctac ttccaactac tgcttttatg ctgccgcaa 780  
 tcatatccgc cgaggtgagg ctgacctgat gattgctgga ggaactgagg ctgcggtcat 840  
 tccaattggg ttaggaggat tcgttgccct cagggcttta tctcaaagga atgatgatcc 900  
 tcagactgcc tcaaggccgt gggataagga ccgtgatggc tttgtgatgg gtgaaggggc 960  
 tggagtattg gttatggaga gcttgagca tgcaatgaaa cggggagcgc cgattattgc 1020  
 agaatatttg ggaggtgcag tcaactgtga tgcttatcat atgactgac caagggctga 1080  
 tgggcttggg gtctcctcgt gcattgagag cagtctcgaa gatgccgggg tctcacctga 1140  
 agaggtcaat tacataaatg ctcatgcgac ttctactctt gctggggatc ttgccgagat 1200  
 aatgccatt aagaaagttt tcaagaacac caaggaaatc aaaatcaatg caactaagtc 1260  
 aatgatcgga cactgtcttg gagcatcagg aggtcttgaa gccatcgaa ccattaaggg 1320  
 aataaccacc ggctggcttc atcccagcat taatcaattt aatcccagc catcggtgga 1380  
 cttcaacact gttgccaaca aaaagcagca acatgaagtg aacgtcgcta tctcgaattc 1440  
 ttttgattt ggagggcaca actcggttgt ggcattctca gctttcaagc catgaattct 1500

acttggttca aaatgcacac cagttgctga gatagggctt caacttgcag agcaattttt 1560  
 taaatgcctt gtcggaagag cgtaataccg gaataggtcg gtcctttgat agttcctcga 1620  
 agccatttag gatgatgttt tactgtaata atcgaagatg attcccattt taaatctagt 1680  
 ctctgattta tgtattagaa agaccaatga aagattttgt gtcattgttg tgttgtcaat 1740  
 gttatttaag ataaagcaaa aaaaaaaaaa aaggcgccg gctctagagg atccagctta 1800  
 ct . 1802

<210> 12  
 <211> 467  
 <212> PRT  
 <213> Cuphea pulcherrima  
 <400> 12

Met Gln Ser Leu His Ser Pro Ser Leu Arg Pro Ser Pro Leu Glu Pro  
 1 5 10 15

Phe Arg Leu Asn Ser Pro Ser Ser Ala Ala Ala Leu Arg Pro Leu Arg  
 20 25 30

Arg Ala Ser Leu Pro Val Ile Arg Ala Ala Thr Ala Ser Ala Pro Lys  
 35 40 45

Arg Glu Ser Asp Pro Lys Lys Arg Val Val Ile Thr Gly Met Gly Leu  
 50 55 60

Val Ser Val Phe Gly Ser Asp Val Asp Ala Tyr Tyr Asp Lys Leu Leu  
 65 70 75 80

Ser Gly Glu Ser Gly Ile Ser Leu Ile Asp Arg Phe Asp Ala Ser Lys  
 85 90 95

Phe Pro Thr Arg Phe Ala Gly Gln Ile Arg Gly Phe Asn Ala Thr Gly  
 100 105 110

Tyr Ile Asp Gly Lys Asn Asp Arg Arg Leu Asp Asp Cys Leu Arg Tyr  
 115 120 125

Cys Ile Val Ala Gly Lys Lys Ala Leu Glu Asp Ala Asp Leu Ala Gly  
 130 135 140

Gln Ser Leu Ser Lys Ile Asp Lys Glu Arg Ala Gly Val Leu Val Gly  
 145 150 155 160

Thr Gly Met Gly Gly Leu Thr Val Phe Ser Asp Gly Val Gln Asn Leu  
 165 170 175

Ile Glu Lys Gly His Arg Lys Ile Ser Pro Phe Phe Ile Pro Tyr Ala  
 180 185 190

Ile Thr Asn Met Gly Ser Ala Leu Leu Ala Ile Asp Leu Gly Leu Met  
 195 200 205

Gly Pro Asn Tyr Ser Ile Ser Thr Ala Cys Ala Thr Ser Asn Tyr Cys  
 210 215 220

Phe Tyr Ala Ala Ala Asn His Ile Arg Arg Gly Glu Ala Asp Leu Met  
 225 230 235 240

Ile Ala Gly Gly Thr Glu Ala Ala Val Ile Pro Ile Gly Leu Gly Gly  
 245 250 255

Phe Val Ala Cys Arg Ala Leu Ser Gln Arg Asn Asp Asp Pro Gln Thr  
 260 265 270

Ala Ser Arg Pro Trp Asp Lys Asp Arg Asp Gly Phe Val Met Gly Glu  
 275 280 285

Gly Ala Gly Val Leu Val Met Glu Ser Leu Glu His Ala Met Lys Arg  
 290 295 300

Gly Ala Pro Ile Ile Ala Glu Tyr Leu Gly Gly Ala Val Asn Cys Asp  
 305 310 315 320

Ala Tyr His Met Thr Asp Pro Arg Ala Asp Gly Leu Gly Val Ser Ser  
 325 330 335

Cys Ile Glu Ser Ser Leu Glu Asp Ala Gly Val Ser Pro Glu Glu Val  
 340 345 350

Asn Tyr Ile Asn Ala His Ala Thr Ser Thr Leu Ala Gly Asp Leu Ala  
 355 360 365

Glu Ile Asn Ala Ile Lys Lys Val Phe Lys Asn Thr Lys Glu Ile Lys

370

375

380

Ile Asn Ala Thr Lys Ser Met Ile Gly His Cys Leu Gly Ala Ser Gly  
 385 390 395 400

Gly Leu Glu Ala Ile Ala Thr Ile Lys Gly Ile Thr Thr Gly Trp Leu  
 405 410 415

His Pro Ser Ile Asn Gln Phe Asn Pro Glu Pro Ser Val Asp Phe Asn  
 420 425 430

Thr Val Ala Asn Lys Lys Gln Gln His Glu Val Asn Val Ala Ile Ser  
 435 440 445

Asn Ser Phe Gly Phe Gly Gly His Asn Ser Val Val Ala Phe Ser Ala  
 450 455 460

Phe Lys Pro  
 465

<210> 13  
 <211> 2369  
 <212> DNA  
 <213> *Cuphea pulcherrima*

<400> 13  
 gtacgcctgc aggtaccggt ccggaattcc cgggtcgacc cacgcgtccg cataaaagag 60  
 agagagaggg atccatcgaa tgcggccacc ctctttcat cttcgattca ttaccataacc 120  
 attccgctga tccattttcc gccttttccg ggtctttcat cccaaagggt atccttttct 180  
 atcctatctt ctcaaagggt cagtcagttc cctccaatgc ctgccgctc ttccctgctc 240  
 gcttcccctc tctgtacgtg gtccttgcc gctgcatgt ctacctcctt ccaccctcc 300  
 gaccctcttc cgccttccat ctctctcct cgcgcagcc tctcccgccg ccggattctc 360  
 tccaatgcg cccactacc ttctgcttc tccgcctcc gcggatccag ttccataacc 420  
 ctgctcacct cttacctgc ctgcttcgag cctgccatg actactatac atccgcatcc 480  
 ttgttcggat ccagacccat tcgcaccacc cgcaggcacc ggaggctcaa tcgagcttcc 540  
 ccttcagggt aggcaatggc cgtggctctg caacctgaac aggaagttac cacaagaag 600  
 aagccaagta tcaaacagcg gcgagtagtt gtgactggaa tgggtgtggg gactcctcta 660  
 ggccatgacc ctgatgtttt ctacaataat ctgcttgatg gaacgagtgg cataagcgag 720

atagagacct ttgattgtgc tcaatttcct acgagaattg ctggagagat caagtctttc	780
tccacagatg gttgggtggc cccgaagctc tctaagagga tggacaagtt catgctatac	840
atgctgaccg ctggcaagaa agcattaaca gatgggtggaa tcaccgaaga tgtgatgaaa	900
gagctagata aaagaaaatg cggagttctc attggctcag caatgggtgg aatgaaggta	960
ttcaatgatg ccattgaagc cctaaggatt tcatataaga agatgaatcc cttttgtgta	1020
cctttcgcta ccacaaatat gggatcagct atgcttgcaa tggacttggg atggatgggg	1080
cccaactact cgatatctac tgcttgtgca acgagtaact tttgtataat gaatgctgcg	1140
aaccatataa tcagaggcga agcagatgtg atgctttgcg ggggctcaga tgcggtaatc	1200
atacctattg gtatgggagg ttttgttgca tgccgagctt tgtcccagag aaattccgac	1260
cctactaaag cttcaagacc atgggacagt aatcgtgatg gatttgttat gggggaagga	1320
gctggagtgc tactactaga ggagtggag catgcaaaga aaagaggtgc gactatttac	1380
gcagaatttc taggtgggag tttcacttgc gatgcctacc acatgaccga gcctcaccct	1440
gatggagctg gagtgattct ctgcatagag aaggctttgg ctgagtcagg agtctctagg	1500
gaagacgtaa attacataaa tgcccatgcc acatccactc cggctggaga tatcaaagag	1560
taccaagctc ttatccactg tttcggccaa aacagagagt taaaagttaa ttcaacaaaa	1620
tcaatgattg gtcaccttct cggagcagcc ggtgggtgtg aagcagtttc agtagttcag	1680
gcaataagga ctgggtggat ccatccgaat attaatttgg aaaaccgaga tgaaggcgtg	1740
gatacaaaat tgctcgtggg tcctaagaag gagagactga acgttaaggt cggtttgtct	1800
aattcatttg ggtttgggtg gcacaactcg tccatactct tcgcccctta catctaggac	1860
gtttccgtgt gtggaattct actcaacata tcaaagctga agttttgagg actccagcat	1920
gttggtagct ccttacgtct ctagacatgc ccatgagttt tgtgtccgga gctttagtcg	1980
gaaccatgac ggattgagta ctcatggcga cacttgatat actccttgct agaattgttg	2040
gtagagcaat attcattatc tcatatTTTT tttttctctg aaatctccct ccttgcaata	2100
gttgtagctt cgagcttttc atcgagtcag tgaagaagag aacaaagctg ttaactcggg	2160
cacgtagtaa ccatttgccc tttgttttgc tctctatttc atcaccgttt tgtggtttta	2220
aaatttgtaa aactagaaga ctggttttaga ttggtttgtt ttctcattga taattggggr	2280
atgtatgttt tggaaataaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa	2340
aaaaaaaaaa agggcggccg ctctagagg	2369

<210> 14  
 <211> 546  
 <212> PRT  
 <213> Cuphea pulcherrima

<400> 14

Met Pro Ala Ala Ser Ser Leu Leu Ala Ser Pro Leu Cys Thr Trp Leu  
 1 5 10 15

Leu Ala Ala Cys Met Ser Thr Ser Phe His Pro Ser Asp Pro Leu Pro  
 20 25 30

Pro Ser Ile Ser Ser Pro Arg Arg Arg Leu Ser Arg Arg Arg Ile Leu  
 35 40 45

Ser Gln Cys Ala Pro Leu Pro Ser Ala Ser Ser Ala Leu Arg Gly Ser  
 50 55 60

Ser Phe His Thr Leu Val Thr Ser Tyr Leu Ala Cys Phe Glu Pro Cys  
 65 70 75 80

His Asp Tyr Tyr Thr Ser Ala Ser Leu Phe Gly Ser Arg Pro Ile Arg  
 85 90 95

Thr Thr Arg Arg His Arg Arg Leu Asn Arg Ala Ser Pro Ser Arg Glu  
 100 105 110

Ala Met Ala Val Ala Leu Gln Pro Glu Gln Glu Val Thr Thr Lys Lys  
 115 120 125

Lys Pro Ser Ile Lys Gln Arg Arg Val Val Val Thr Gly Met Gly Val  
 130 135 140

Val Thr Pro Leu Gly His Asp Pro Asp Val Phe Tyr Asn Asn Leu Leu  
 145 150 155 160

Asp Gly Thr Ser Gly Ile Ser Glu Ile Glu Thr Phe Asp Cys Ala Gln  
 165 170 175

Phe Pro Thr Arg Ile Ala Gly Glu Ile Lys Ser Phe Ser Thr Asp Gly  
 180 185 190

Trp Val Ala Pro Lys Leu Ser Lys Arg Met Asp Lys Phe Met Leu Tyr

195					200					205					
Met	Leu	Thr	Ala	Gly	Lys	Lys	Ala	Leu	Thr	Asp	Gly	Gly	Ile	Thr	Glu
210						215					220				
Asp	Val	Met	Lys	Glu	Leu	Asp	Lys	Arg	Lys	Cys	Gly	Val	Leu	Ile	Gly
225					230					235					240
Ser	Ala	Met	Gly	Gly	Met	Lys	Val	Phe	Asn	Asp	Ala	Ile	Glu	Ala	Leu
				245					250					255	
Arg	Ile	Ser	Tyr	Lys	Lys	Met	Asn	Pro	Phe	Cys	Val	Pro	Phe	Ala	Thr
			260					265					270		
Thr	Asn	Met	Gly	Ser	Ala	Met	Leu	Ala	Met	Asp	Leu	Gly	Trp	Met	Gly
		275					280					285			
Pro	Asn	Tyr	Ser	Ile	Ser	Thr	Ala	Cys	Ala	Thr	Ser	Asn	Phe	Cys	Ile
	290					295					300				
Met	Asn	Ala	Ala	Asn	His	Ile	Ile	Arg	Gly	Glu	Ala	Asp	Val	Met	Leu
305					310					315					320
Cys	Gly	Gly	Ser	Asp	Ala	Val	Ile	Ile	Pro	Ile	Gly	Met	Gly	Gly	Phe
				325					330					335	
Val	Ala	Cys	Arg	Ala	Leu	Ser	Gln	Arg	Asn	Ser	Asp	Pro	Thr	Lys	Ala
			340					345					350		
Ser	Arg	Pro	Trp	Asp	Ser	Asn	Arg	Asp	Gly	Phe	Val	Met	Gly	Glu	Gly
		355					360					365			
Ala	Gly	Val	Leu	Leu	Leu	Glu	Glu	Leu	Glu	His	Ala	Lys	Lys	Arg	Gly
	370					375					380				
Ala	Thr	Ile	Tyr	Ala	Glu	Phe	Leu	Gly	Gly	Ser	Phe	Thr	Cys	Asp	Ala
385					390					395					400
Tyr	His	Met	Thr	Glu	Pro	His	Pro	Asp	Gly	Ala	Gly	Val	Ile	Leu	Cys
				405					410					415	
Ile	Glu	Lys	Ala	Leu	Ala	Gln	Ser	Gly	Val	Ser	Arg	Glu	Asp	Val	Asn
			420					425					430		



Tyr Ile Asn Ala His Ala Thr Ser Thr Pro Ala Gly Asp Ile Lys Glu  
435 440 445

Tyr Gln Ala Leu Ile His Cys Phe Gly Gln Asn Arg Glu Leu Lys Val  
450 455 460

Asn Ser Thr Lys Ser Met Ile Gly His Leu Leu Gly Ala Ala Gly Gly  
465 470 475 480

Val Glu Ala Val Ser Val Val Gln Ala Ile Arg Thr Gly Trp Ile His  
485 490 495

Pro Asn Ile Asn Leu Glu Asn Pro Asp Glu Gly Val Asp Thr Lys Leu  
500 505 510

Leu Val Gly Pro Lys Lys Glu Arg Leu Asn Val Lys Val Gly Leu Ser  
515 520 525

Asn Ser Phe Gly Phe Gly Gly His Asn Ser Ser Ile Leu Phe Ala Pro  
530 535 540

Tyr Ile  
545

<210> 15  
<211> 2372  
<212> DNA  
<213> Cuphea pulcherrima

<220>  
<221> misc\_feature  
<222> (1)..(2300)  
<223> unsure at all n locations

<400> 15  
acntggtccg gaattcccgg gtcgaccac gcgtccgcga cgccaaccca caccaaaactt 60  
cctcagcttc tcttctcaag acggacgcc ttggcagcag acagacagac agacagaccc 120  
ataaaagaga gagagaggga tccatcgaat gcggccaccc tcctttcatc ttcgattcat 180  
taccatacca ttccgctgat ccattttccg ccttttccgg gtctttcatc ccaaagggta 240  
tccttttcta tcctatcttc tcaaagggtc agtcagttcc ctccaatgcc tgccgcctct 300

tccctgctcg cttccctct ctgtacgtgg ctccctgccc cctgcatgtc tacctccttc	360
caccctccg accctcttcc gccttcacac tctctctctc gccgacgct ctcccgcgc	420
cggattctct cccaatgcgc ccactacct tctgcttct cgcctccg cggatccagt	480
ttccataccc tcgtcacctc ttacctcgcc tgcctcgagc cctgccatga ctactataca	540
tccgcacct tgttcggatc cagaccatt cgcaccaccc gcaggcaccg gaggtcaat	600
cgagcttccc cttccagggg aggcaatggc cgtggctctg caacctgaac aggaagttac	660
cacaaagaag aagccaagta tcaaacagcg gcgagtagtt gtgactggaa tgggtgtggt	720
gactcctcta ggccatgaac ctgatgtttt tctacaataa tctgcttgat ggaacgagt	780
gcataagcga gatagagacc tttgattgtg ctcaatttcc tacgagaatt gctggagaga	840
tcaagtcttt ctccacagat ggttgggtgg cccgaagct ctctaagagg atggacaagt	900
tcatgctata catgctgact gctggcaaga aagcattaac agatggtgga atcaccgaag	960
atgtgatgaa agagctagat aaaagaaat gcggagtctt cattggctca gcaatgggtg	1020
gaatgaagggt attcaatgat gccattgaag ccctaaggat ttcataaag aagatgaatc	1080
ccttttgtgt acctttcgct accacaaata tgggatcagc tatgcttgca atggacttg	1140
gatggatggg gcccaactac tcgatatcta ctgcttgtgc aacgagtaac tttgtataa	1200
tgaatgctgc gaaccatata atcagaggcg aagcagatgt gatgctttgc gggggctcag	1260
atgcggtaat catacctatt ggtatgggag gttttgttgc atgccgagct ttgtcccaga	1320
gaaattccga ccctactaaa gcttcaagac catgggacag taatcgtgat ggatttgta	1380
tgggggaagg agctggagtg ctactactag aggagttgga gcatgcaaag aaaagaggtg	1440
cgactattta cgcagaattt ctaggtggga gtttcacttg cgatgcctac cacatgaccg	1500
agcctcacc tgatggagct ggagtgattc tctgcataga gaaggctttg gctcagtcag	1560
gagtctctag ggaagacgta aattacataa atgcccagtc cacatccact ccggctggag	1620
atatcaaaga gtaccaagct cttatccact gtttcggcca aaacagagag ttaaaagtta	1680
attcaaccaa atcaatgatt ggtcaccttc tcggagcagc cgggtggtgtg gaagcagttt	1740
cagtagttca ggcaataagg actgggtgga tccatccgaa tattaatttg gaaaaccag	1800
atgaaggcgt ggatacaaaa ttgctcgtgg gtcctaagaa ggagagactg aacgttaagg	1860
tcggtttgtc taattcattt gggtttggtg ggcacaactc gtccatactc ttcgccccct	1920
acatctagga cgtttcgtgt gtggaattct actcaacata tcaaagctga agttttgagg	1980
actccagcat gttgtagct cttacgtct ctagacatgc ccatgagttt tgtgtccgga	2040

gcttttagtcg gaaccatgac ggattgagta ctcatggcga cacttgatat actccttgct	2100
agaattgttg gtagagcaat attcattatc tcatatTTTT ttttctctg aaatctccct	2160
ccttgcaata gttgtacttt cgagcttttc atcgagtcag tgaagaagag aacaaagctg	2220
ttaaactcggg cacgtagtaa ccatttgccc tttgttttgc tctctatttc atcaccgttt	2280
tgtggtttta aaatttgtaa aactagaaga ctggtttaga ttggtttggt ttctcaaaaa	2340
aaaaaaaaa gggcggccgc tctagaggat cc	2372

<210> 16  
 <211> 1580  
 <212> DNA  
 <213> *Cuphea hookeriana*

<220>  
 <221> misc\_feature  
 <222> (1)..(1578)  
 <223> unsure at all n locations

<400> 16	
cctgaatcgg attcaagaga gagtttcggt gctgggatgg cgaatgcac tgggtttctg	60
ggttcttcag ttctgccc gagaaaggca actcagcatt cgatttcac gtctcgtgga	120
tcttctcgg agtttgctc caaaaggggtg ttttgctgta gtgccgttca ggattctgac	180
aggcagtctt tgggtgattc tcgctcgccg aggccttgta gtagaggatg caaattaatt	240
ggatctgggt ctgctatacc agctcttcaa gtctcaaagt atgatcttgc taaaattgtc	300
gacaccaatg atgaatggat tactgtccga acggggatcc gcaaccgaag ggttctctca	360
ggtaaagata gtcttacaaa tttagcatca gaggcagcaa ggaaagctct agagatggca	420
caggtagacg caaatgatgt ggatatggtt ttgatgtgta cttctacccc tgaggacctt	480
ttcggcagtg ctctcagat atcgaaagca cttggctgca aaaagaatcc tttgtcttac	540
gacattaccg ctgcatgcag tggatttggt ttgggttttag tctcagctgc ttgccacatt	600
agagggtggg gttttaacaa tattctagtgt attggtgctg attctctttc tcggtatggt	660
gactggaccg atcggggaac atgtattctc tttggagatg ctgctggagc tgtagtggtg	720
cagtcagtgt atgctgagga agatgggctc tttgcttttg atttgcatag cgatggagat	780
gggcaaaggc atctaaaagc tgcaatcaaa gaagatgaag ttgataaagc cctgggacat	840
aatgggtcca tcagagattt tccaccaagg cgttcttcat actcttgcac ccaaatgaac	900

ggtaaagagg tattccgctt tgcttgccgc tctgtgcctc agtcaatcga atcagcactt 960  
 ggaaaggccg gtcttaatgg atccaacatc gactgggttg tgcttcatca ggcaaatacag 1020  
 aggatcattg atgcagtagc aacacgtcta gaggttcctc aagaacgaat tatctcaaac 1080  
 ttggcaaatt acgggaacac tagtgcgga tccattccct tggcactaga cgaagctgtg 1140  
 aggagtggaa atgtgaagcc gggtcacgtg attgcaaccg caggatttgg cgccggactc 1200  
 acatgggggt ctgctattat caggtgggga taagactgaa gccgagccag cactgcagct 1260  
 tcctctcaaa ccgatgtttc acgaaatddd gcttccatga ccanaaaaag aagaagtcag 1320  
 tcttttatgg agcaagcaac acgacacgat cttcatcaca ttgccctttt tcgttcccct 1380  
 tttccattag tttgatgatt ttgctgacaa tacaataccc atagtttctt ttgtccccaa 1440  
 taagttattd gtttcttggt taattgttca gcttttactt cattttgtct cgggacattg 1500  
 gagatgacag cataaacatc atgtttatat tttgctaaaa aaaaaaaaaa aaaaaaaaaa 1560  
 aaaaaaaaaa aaaaaaaaaa 1580

<210> 17  
 <211> 398  
 <212> PRT  
 <213> Cuphea hookeriana

<400> 17

Met Ala Asn Ala Ser Gly Phe Leu Gly Ser Ser Val Pro Ala Leu Arg  
 1 5 10 15

Arg Ala Thr Gln His Ser Ile Ser Ser Ser Arg Gly Ser Ser Ser Glu  
 20 25 30

Phe Val Ser Lys Arg Val Phe Cys Cys Ser Ala Val Gln Asp Ser Asp  
 35 40 45

Arg Gln Ser Leu Gly Asp Ser Arg Ser Pro Arg Leu Val Ser Arg Gly  
 50 55 60

Cys Lys Leu Ile Gly Ser Gly Ser Ala Ile Pro Ala Leu Gln Val Ser  
 65 70 75 80

Asn Asp Asp Leu Ala Lys Ile Val Asp Thr Asn Asp Glu Trp Ile Thr  
 85 90 95

Val Arg Thr Gly Ile Arg Asn Arg Arg Val Leu Ser Gly Lys Asp Ser

100

105

110

Leu Thr Asn Leu Ala Ser Glu Ala Ala Arg Lys Ala Leu Glu Met Ala  
 115 120 125

Gln Val Asp Ala Asn Asp Val Asp Met Val Leu Met Cys Thr Ser Thr  
 130 135 140

Pro Glu Asp Leu Phe Gly Ser Ala Pro Gln Ile Ser Lys Ala Leu Gly  
 145 150 155 160

Cys Lys Lys Asn Pro Leu Ser Tyr Asp Ile Thr Ala Ala Cys Ser Gly  
 165 170 175

Phe Val Leu Gly Leu Val Ser Ala Ala Cys His Ile Arg Gly Gly Gly  
 180 185 190

Phe Asn Asn Ile Leu Val Ile Gly Ala Asp Ser Leu Ser Arg Tyr Val  
 195 200 205

Asp Trp Thr Asp Arg Gly Thr Cys Ile Leu Phe Gly Asp Ala Ala Gly  
 210 215 220

Ala Val Val Val Gln Ser Cys Asp Ala Glu Glu Asp Gly Leu Phe Ala  
 225 230 235 240

Phe Asp Leu His Ser Asp Gly Asp Gly Gln Arg His Leu Lys Ala Ala  
 245 250 255

Ile Lys Glu Asp Glu Val Asp Lys Ala Leu Gly His Asn Gly Ser Ile  
 260 265 270

Arg Asp Phe Pro Pro Arg Arg Ser Ser Tyr Ser Cys Ile Gln Met Asn  
 275 280 285

Gly Lys Glu Val Phe Arg Phe Ala Cys Arg Ser Val Pro Gln Ser Ile  
 290 295 300

Glu Ser Ala Leu Gly Lys Ala Gly Leu Asn Gly Ser Asn Ile Asp Trp  
 305 310 315 320

Leu Leu Leu His Gln Ala Asn Gln Arg Ile Ile Asp Ala Val Ala Thr  
 325 330 335

Arg Leu Glu Val Pro Gln Glu Arg Ile Ile Ser Asn Leu Ala Asn Tyr  
340 345 350

Gly Asn Thr Ser Ala Ala Ser Ile Pro Leu Ala Leu Asp Glu Ala Val  
355 360 365

Arg Ser Gly Asn Val Lys Pro Gly His Val Ile Ala Thr Ala Gly Phe  
370 375 380

Gly Ala Gly Leu Thr Trp Gly Ser Ala Ile Ile Arg Trp Gly  
385 390 395